G.C.E. Advanced Level

Business Studies

New Syllabus

Competency
17

Information System

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Unit	Information
17	**System**

17.1: Classifies information examining the data processing

Learning Outcomes:

- Defines data and information.
- Explains the difference between data and information.
- Explains about the data processing process.
- Shows the characteristics of information
- Classifies the information on various criteria.
- Generates required information through given data.

Data

Basic facts and numbers generated by various events that take place in the environment or in the organization and by business transactions are known as data.

Example : The name and the salary of an employee

The time that a transaction took place and its value

Monthly electricity bill etc…

The ways data can be presented

- Pictorial data : Photographs of goods
- Numerical data : Prices of the goods
- Audio data : Recorded consumer ideas
- Visual data : Boards that show prices

Information

The processed data which is understandable and is called information.

Examples : Net profit ratio of a business

Sales cost of a unit

Annual total electricity bill

Total production units

Differences between data and information

Data	Information
• Data is an input	• Information is an output
• Data cannot be used directly to make decisions.	• Information can be used directly to make decisions.
• Data are of no value until they are in the form of data.	• A value contains in information

Data processing

Data	→	Processing	→	Information
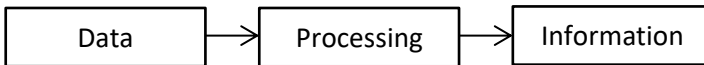
Functions in data processing process

- Classifying : Categorizing data based on their features
- Sorting : Arranging data in a specific order
- Calculating : Subjecting data into mathematical or rational process
- Summarizing : Presenting data briefly in order to get some idea

The evolution of information technology

- **Nomadic Era**

  The ancient man who lived in a Stone Age the nomadic era behaved as a nomadic being. The social unit was the small groups. Their needs were very simple and fulfilled from their own surrounding. Communication was verbal and the major communication media was the speech.

- **Agriculture Era**

  The man who survived with hunting having fulfilled the needs from the environment prompted for permanent dwellings. The agriculture became the main mean of living. The agro-resources became an essential factor in social development. The social institutions called cities and states were originated. Usage of letters (alphabet) and symbols became popular in communication. Hand written scripts were used at the beginning and later printed materials contributed considerably in communication.

- **Industrial Era**

  With the industrial revolution knowledge, machinery and equipment became essential factors in social development. The printing technology gained the prime place in communication affairs and later the electronic communication methods emerged. As a result communication was progressed remarkably. In this era, many age large scale businesses were started and then information became very important for those entities.

- **Information era**

  The modern man is living in an information era. The integrated expansion of communication and information technology is especially remarkable in this era. The size of business was widened gradually and the business activities began to expand globally. Due to this broad expansion in business affairs proper handling of the information resource has become essential for the social development.

Types of Data processing technology

- **Manual system**

  Arranging of data using stationary such as a pen, pencils and papers
  Data processing equipment: pen, pencil, paper and stationary

- **Semi manual system**

  Processing of data using primary level data processing machines like the type writer and labour
  Data processing equipment: Type writer

- **Electro mechanical system**

  Processing of data using automated data processing machines like electronic typewriters / Semi-automated data processing machines like electronic type writers were used in this method.

- **Electronic data processing**

  Automated data processing is done using the computers. Data processing can be done very easily and more accurately in this manner
  Data processing equipment: Computer

The characteristics of good information

- Descriptive
- Accuracy
- Flexible
- Timely
- Readily available
- Thriftiness
- Comparable
- Competencies
- Understandable
- Relevancy
- Reliable

The way of classifying information based on various criteria

Classification Criteria	Information Classification
• According to the source	- External information - Internal information - Primary information - Secondary information
• According to the nature	- Quantitative information - Qualitative information
• According to the level of management	- Strategical information - Tactical information - Operational information
• According to the time period	- Past information - Present information - Future information
• According to the probability	- Definite information - Probable information
• According to the management function.	- Financial information - Production information - Marketing information - Human resource information
• According to the collectiveness and seperatedness	- Collective information - Separated information

17.2: Examines the importance and the role of the information system of a business.

Learning Outcomes:
- Explains 'Information system'.
- Explains the necessity and importance of an information system.
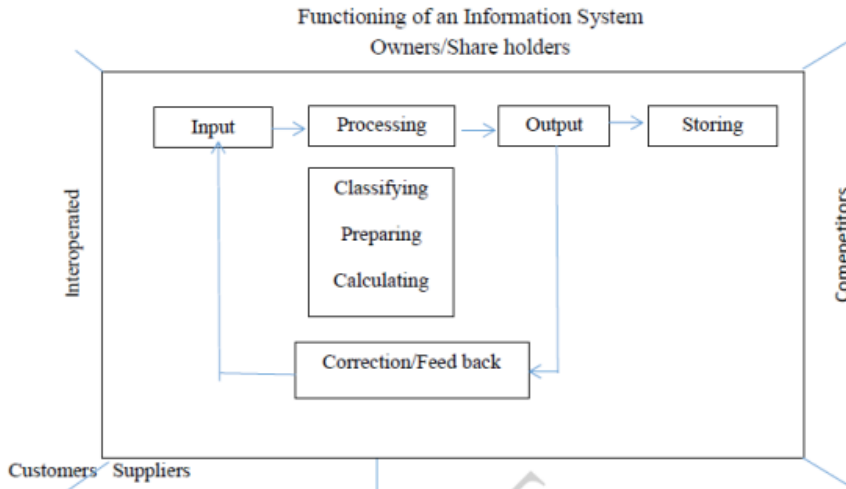- Explains the role of an information system.

Information system

- A set of components with inter relation engaged in collecting, processing, storing and delivering of information that are necessary for decision making and controlling of a business in known as information system.
- Data are transformed into information through an information system, and it is a process.

Components that transform data into information / Functions of information system

- **Input**
  Collection of data required for an information system is meant by this.

- **Processing**
  The process of converting the collected data into an information is known as processing.

- **Output**
  Presentation of data processed through data processing process to the relevant parties is meant by output.

- **Storing**
  Safe Storing of the information that is generated by the system in order to use later when necessary.

- **Feed back**
  Evaluation or inquire of comments of input through forwarding the output to relevant parties is known as feedback.

Functioning of an Information System

Functioning of an Information System
Owners/Share holders

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┌─────────────────────────────────────────────────────────┐
│   ┌───────┐   ┌────────────┐   ┌────────┐   ┌─────────┐  │
│   │ Input │ → │ Processing │ → │ Output │ → │ Storing │  │
│   └───────┘   └────────────┘   └────────┘   └─────────┘  │
│                ┌────────────┐                            │
│                │ Classifying│                            │
│                │ Preparing  │                            │
│                │ Calculating│                            │
│                └────────────┘                            │
│          ┌──────────────────────┐                        │
│          │ Correction/Feed back │                        │
│          └──────────────────────┘                        │
└─────────────────────────────────────────────────────────┘
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(Left side: Interoperated — Right side: Competitors — Bottom: Customers Suppliers)

Components of a computerized information system

- **Hardware**

  All physical components in an information system are known as hardware.

  Ex:- Key board, monitor, printer, central processing unit (CPU)

- **Software**

  Computer programs used for data processing

  Ex:- Word , Excel etc…

- **Live ware**

  Users or consumers of the information system are known as live ware.

  Ex:- computer engineers, computer programmers, Data processors, persons who obtain the services through ATM cards

- **Data**

  Basic factors and numbers data entered into the information system is known by this.

- **Procedures**

  The agreements, regulations and policies established to control the functions and components of the information system are meant by procedures.

- **Firmware**

  Computer programs stored permanently in chips, that are in the components is known by this.

  Example : Microchip, IC

The importance and necessity of an information system

- To make decisions relevant to management.
- To achieve the goals and objectives of the organization.
- To fulfill the daily functions of a business accurately and successfully.
- To improve the productivity of the organization.
- To minimize the resource wastage
- To continue operational activities.
- To minimize errors and storage space.

Expected functions through an effective information system

- Communicating information to the relevant parties accurately.
- Assisting in upliftment of the quality of the product.
- Assisting in minimizing the cost of the institute.
- Providing a situation to face the competition successfully.
- Ascertaining the successfulness of the managerial functions.
- Providing relevant information for required parties at any required time.

17.3: Classifies information systems according to the level of their usage examining the methods of classification of information systems.

Learning Outcomes:
- Shows the criteria used to classify the information system.
- Classifies the information systems according to the levels of usage.
- Gives examples for the users of information systems according to the levels of usage.

Various criteria used for classification of information systems

- According to the level of usage
- According to the usage
- According to the managerial functions

Types of information systems according to the level of usage

- Strategic level information systems
- Management level information systems
- Knowledge level information systems
- Operational level information systems

Strategic level information systems

- The information systems that assist top managers of an organization to make strategic decisions as well as to solve internal and external problems are known by this.
  Ex : Chairman, General Manager, Director Board
- This level managers make decisions which would decide the future path, affect the entire organization and are of long term existence. The internal as well as the external information of the organization are required for it. Most of the time the information required by them should be provided in summarized form.

Management level information system

- A type of systems that assist middle level managers to make decisions, monitor and control. This systems is used to implement and control the activities accordingly to with the decisions made by strategic level managers.
- Marketing managers, financial managers, production managers and human resource managers are some of the managers who use information systems of this level.

Knowledge level information system

- Knowledge employees and data employees are two types of employees at this level. The information systems that are used by them are known as knowledge level information systems. These information systems are used for discovering organizing and integrating new knowledge.
- Knowledge level employees are the professionals such as lawyers, accountants' auditors and engineers. They are the ones who generate information.
- Data employees are the employees such as clerks and computer operators who engage in activities like copying the information, distributing and using of the information.

Operational level information system

- The information systems that assist operational managers to make decisions on basic activities and transactions of the business are known by this.
- Information such as sales, receipt of money, depositing of money, pay sheets, purchasing of materials and usage of materials etc. are processed through these systems.
- Managerial employees of operational level like supervisors and storekeepers etc. use these information systems.

The activities done and decision made by the management board in conducting the school

- Preparing annual time table
- Uplifting the performance in the next year.
- Implementing daily time table.
- Calculating the attendance of the school students daily.
- Calculating annual teachers' requirements.
- Calculating school layout requirements.

17.4: Classifies information systems according to the usage

Learning Outcomes:
- Classifies information systems according to the usage.
- Explains the characteristics of each information system according to the usage.
- Explains the role of each information system according to the usage.

Classification of information systems on usage

- Executive Support Systems (ESS)
- Decisions Support Systems (DSS)
- Management Information Systems (MIS)
- Office Automation Systems (OAS)
- Knowledge Work Systems(TPS)
- Transaction Processing Systems (TPS)
- Business Intelligence Systems (BIS)

Executive Support Systems (ESS)

- The information systems that have been developed to provide the required information to top level managers to make decisions are known as Executive Support Systems.
- These are the information systems operated at strategic level.
- The strategic level managers often have to make non structured decisions which do not match with a pre-determined problem solving structures. The information systems developed for providing required information to take such decisions are known as Executive Support Systems.

Decision Support Systems

- These are the information systems that are used at management level. These can be introduced as the type of systems with analytical ability that assist middle managers to make uniform structured and semi-structured decisions which cannot be determined easily and keep on changing rapidly.

Structured decisions – Calculating of the EOQ according to the formula.

Semi-Structured decisions – Investment evaluating decisions.

- These systems are used in various management activities specially at preparing plans, formulating structures, evaluating alternatives and making decisions etc…

Management Information Systems (MIS)

- These are the information systems that are used at middle management level.
- The information systems that assist middle level managers to make planning decisions, monitor and control. These are the information systems that assist middle level managers to directly reach the current performance and past reports.
- These systems provide information in the form of reports at a specially required occasion or periodically as daily, weekly, monthly and annually.

  Ex:- Periodical reports – Daily sales reports,

  Monthly – Receipts from debtors reports

  Special reports – Providing a report regarding a specific debtor when the management insists for it.

Office Automation Systems (OAS)

- These are the information systems that facilitate to copy data and information electronically and to communicate them in the same form.
- These are operated in knowledge level. These are used by the assistant accountants, secretaries and clerks etc.. who engage in the affairs related to data processing. Since they engage in distribution as well as in consumption of data, these systems comprise of the techniques for pasting and communicating the data.
- Hence, the goal of the office automation systems is to facilitate E-pasting of data and information as well as communicating them in the same form.

  Ex:- For preparing documents - Word Processing Systems

  For communicating information E – mail

Knowledge Works Systems (KWS)

- These are the information systems that assist in knowledge employees in generating and integrating new knowledge of an organization.
- These are the information systems that operate at knowledge level. These are the information systems that generate information required by knowledge employees such as engineers, doctors, lawyers and researchers etc. Since these are for persons who generate knowledge, these systems are not uniform.

  Ex:- Computer Aided Designing (CAD)

Transaction Processing Systems (TPS)

- The information systems used to process date generated from daily operations of an organization are known as Transaction Processing Systems.
- These are the systems used to process basic data generated through frequently occurring functions of an organization. Reporting and necessary updating of the data relevant to daily operations are done using these systems. There can be several transaction processing systems developed for each department of an organization.

Ex:-   Production division - To purchase materials

- To order materials.

Marketing division - To receive selling orders

- To price the goods.

Financial / Accounting division - To prepare budgets,

- To prepare general leader

- To make cash payments

Human Resource Division - To prepare pay sheets

- To record employee attendance

- For training and development
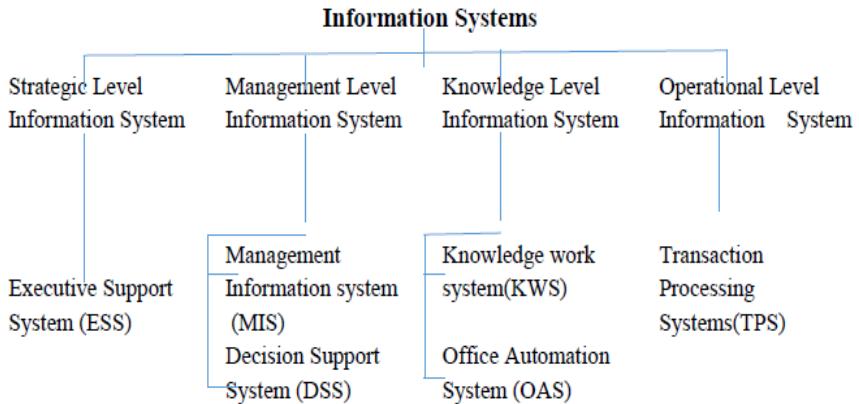
Business Intelligence Systems (BIS)

- These are the systems that strengthen Executive Support System. These systems are developed using data and information which are to be used for Decision Support Systems. These are systems that comprise of abilities, processes, technological usage and practices.
- Even though the systems are classified on usage in the above manner, there is an inter-relationship among these systems.

The relationship among information systems according to usage
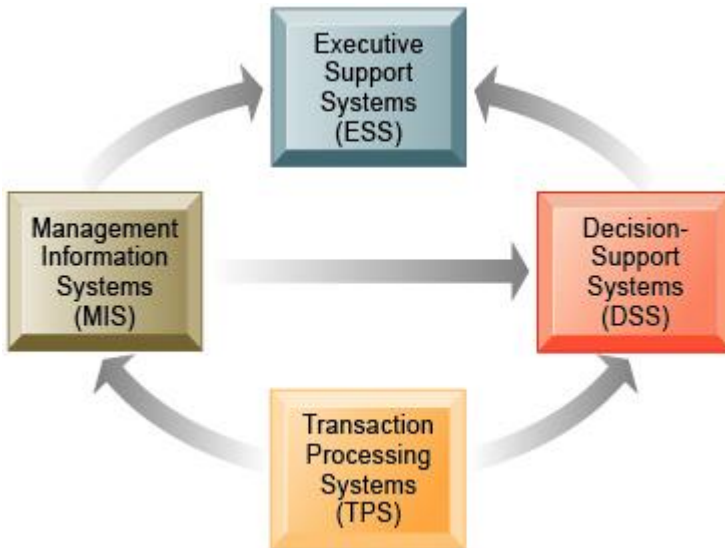
The above arrow heads shows the directions of flow of data. Accordingly, the Transaction Processing Systems (TPS) of an organization are the information systems that provide data for other information systems (DSS, MIS). ESS receives data from MIS and DSS.

Inter-relationship among the information systems classified according to the usage and management levels

Information Systems

Strategic Level Information System	Management Level Information System	Knowledge Level Information System	Operational Level Information System
Executive Support System (ESS)	Management Information system (MIS) Decision Support System (DSS)	Knowledge work system(KWS) Office Automation System (OAS)	Transaction Processing Systems(TPS)

17.5: Classifies information systems according to management functions

Learning Outcomes:
- Classifies information systems according to functions of management.
- Explains the characteristics of each information system according to management functions.
- Explains the relationship among various information systems.

Classifications of information systems by considering the fact that to which management function the information system provides information

- **Operation Information Systems**

  The information systems used to process information needed for operational activities.

  Eg: Planning and controlling of purchases

  Computer Integrated Manufacturing (CIM)

  Operation process and machine control

- **Marketing Information System**

  The information systems installed to process information relevant to marketing management.

- **Financial and Accounting Information Systems**

  The information systems installed for financial and accounting activities.

  Eg: Cash management   Capital budgeting

  Financial planning   Financial forecasting

  Accounts payable   Accounts receivable

  General Ledger

- **Human Resource Information Systems**

  The information systems used for human resource management.

  Eg: Human resource planning   Employee records

  Pay sheets   Training and development

  Performance evaluation

- **Research and Development Information Systems**

  The information systems that prepare information required for research and development division.

  Eg: Product research

  Product development

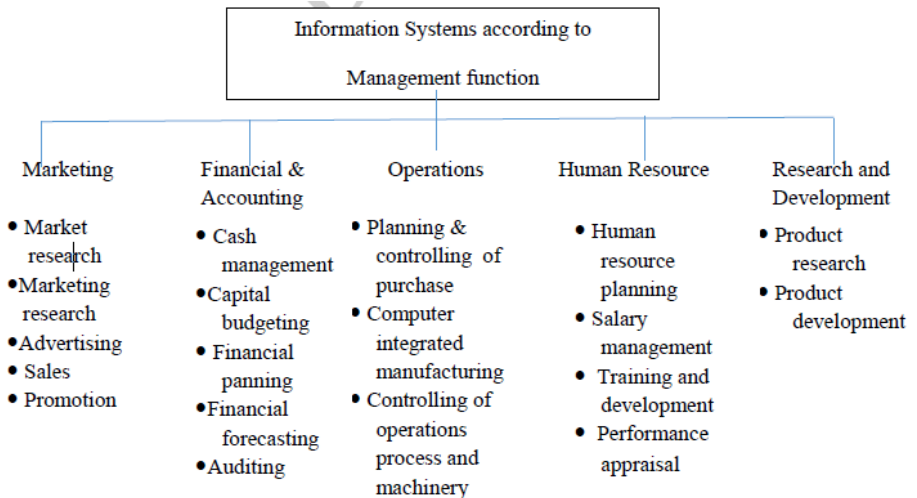## Inter-relationship between information systems

Even though the information systems that are in an organization are classified on management function, there is an inter-relationship among them.

Example:

Presenting a new advertisement prepared for the product of the organization having a proper marketing research conducted by research and development function of the organization. This is relevant to marketing management information system, research and development information system as well as to financial management system.

The classification of information systems according to the functions and examples for them

		Information Systems according to Management function		
Marketing	**Financial & Accounting**	**Operations**	**Human Resource**	**Research and Development**
• Market research • Marketing research • Advertising • Sales • Promotion	• Cash management • Capital budgeting • Financial panning • Financial forecasting • Auditing	• Planning & controlling of purchase • Computer integrated manufacturing • Controlling of operations process and machinery	• Human resource planning • Salary management • Training and development • Performance appraisal	• Product research • Product development

17.6: Reveals the benefits of information technology by inquiring about it.

Learning Outcomes:

- Explains what information technology is.
- Explains the other technologies related to information technology.
- Shows the importance of information technology.
- Lists the benefits of information technology.

Information technology

Acquisition, processing, storing and delivering of verbal, pictorial, alphabetical and numerical information through telecommunication and computer technology can be stated as information technology.

Information Technology:
- Information Management
- Communication Technology
- Computer Technology
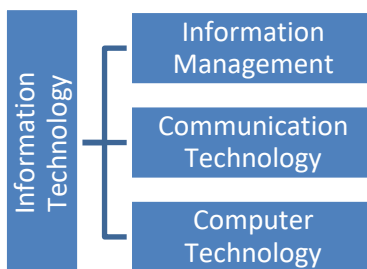
Contents of information technology

The information technology is an integration of various technological fields.

- **Computing Technology**
    - The study on the calculations that take place in information systems is known as computing technology.
    - Since the marine equipment that does this calculation is being the computer at present, this is sometimes called computer technology. Accordingly, a person who studies information technology should also study the computer technology. While this field has been improved a lot at present, computers that has ability of calculating billion amounts of calculations accurately within a second have been generated at present.

- **Communication Technology**

    This is the communication technology that is used to deliver the processed data to the relevant party. Even though the information processed manually were handed over by carrying physically under traditional systems, today the information can be sent in few seconds to anywhere in the world using internet systems through communication technology.

- **Information Management Technology**
    - The process of using information resources efficiently and effectively by managing the computer and communication technology available in a particular institute is known as information management technology.
    - Even though an institute possesses what so ever advanced computer and communication facilities, they are useless in the absence of a procedure to process information transmit and the effective use of it. There will be various problems in institutes where the information technology is used without proper knowledge on information management.

The importance of information technology

- Ability to make more accurate decisions easily
- Minimizing the errors in performance and increase in reliability
- Ability to perform the processes efficiently
- Ability to perform the processes effectively
- Upliftment the quality of the products
- Availability of massive storage capacity for information
- Decrease in the cost of processing
- Ability to face competition
- The process of communication being easy
- Easy to access to consumers or employees
- Minimizing the distance between nations and individuals
- People and consumers get a chance to receive a more efficient service
- Widening the awareness of the people since the rapid generation and transmission of new knowledge
- Expansion of the international trade

Benefits of information technology

- **Speed**
  By obtaining even the complex things at a high speed and by classifying them, they could be reuse.
- **Accuracy**
  Since the number of people who participate in electronic information operation systems are less, the chances to make any mistake are very low.
- **Flexibility**
  Ability to use for various functions exquisitely and ability to make any changes according to the relevant function.
- **Reliability**
  It is something that is created by accuracy.
- **Improved quality**
  This means, the affairs conducted using this technological information also contain high quality.

- **Management of large quantity of information**

  While a large amount of information could be obtained using technology, there is the ability of managing them to make decisions using those information as required.

- **Less Employment**

  Employees being minimized because of using technological equipment.

- **Low Space**

  Low space being sufficient for the usage of technological equipment.

- **Low Cost**

  There is the ability for minimizing the cost by being thrift because of the above factors.

17.7: Uses of internet to communicate information

Learning Outcomes:
- Explains the internet.
- Explains the services provided by the internet.
- Explains how internet can be used for the daily personal activities to make them easy.
- Explains how internet helps to organizational activities to make them easy.
- Shows how social networks are used by the businesses.

Computer network

A computer network is a connection of two or more computers for the fulfillment of functions like exchanging of messages, exchanging of data and information.

Several computer networks can be identified based on the way the computers are connected in a particular network.

- **BUS network**

  The network in which all the computers are located connecting directly to a common line. Even though one computer connected to the network is out of order the other computers are not affected.

- **RING network**

  A network that has been arranged so as to connect with two other computers in the same network is called a ring network. There is no central computer.

- **STAR network**

  A network in which other computers are connected to a central computer is known as a STAR network. Other computers can be connected through this central computer. If the central computer is out of order, then it cannot exchange information with other computer.

- **TREE network**

  A network in which other computers are connected to the central computer like branches of a tree stretch out. If the central computer or another one is out of order, information cannot be conveyed to the other computer beyond that particular one.

Types of computer networks (according to the geographical dispersion)

- **Local Area Network (LAN)**

  This network is arranged with a mutual connection of computers and workshops located in the same building or same workshop.

- **Wide Area Net wok (WAN)**

  A network built up connecting the computers located in several cities or several countries is known as WAN. Internet is a wide area network.

There are several computer networks based on the party used or objectives of using

- **Intranet**

  This is a network which is under the control of a particular individual or an institute. This service can be consumed only by authorized parties.

- **Extranet**

  This is a network system through which an intranet user can receive a lot of mutual benefits. Extranets are built up through intranets.

- **Internet**

    Interne is an abbreviation for the inter connected network. Internet is an integrated network of computers, computer network programs, information and users of them. This network which is a worldwide network, can be accessed from anywhere in the world.

Internet

- "Internet is a computer network that has been developed covering a wide range of area".
- A situation with activities in which exchange f information tale place connecting thousands of extended computer networks in the world and which enables to connect at any time is known as internet.

Services provided by the internet

- **World Wide Web (WWW)**
    - The system under globally accepted standards available for classification, retrieving, preparation and demonstration of information of computer network is known as World Wide Web.
    - It is also a collection of millions of electronic documents or articles stored in internet to be referred or viewed by the others. Through a web browser, the ability for entering the World Wide Web can be obtained.

        Ex:- Internet Explorer Netscape.
    - Search engines support to search web sites in world wide web. Ex :- Google, Yahoo, MSN.
- **E-mail**
    - Exchanging of information from a computer to a computer through a communication link is known as e-mail.
    - The sender and receiver should have internet facilities as well as email addresses in order to send an electronically processed message. Photos, documents, pictures, voice and live movies can be sent along with e-mails.

- **File Transfer Protocol**

  The technique used to exchange the files mutually among the computers connected with internet. This method allows copying and exchanging of the files including documents consisting of information, songs, cinemas, computer games etc.

- **Chatting Facilities**
  - People who live all over the world can call and chat with each other staying at their homeitself. Through these facilities,
  - One's ideas are typed and sent to the other parties (Text chatting)
  - Exchanging views verbally (voice chatting)
  - Exchanging scenes in addition to voice using web cameras (video chatting)

- **VOIP voice over internet protocol**

  Text + sound + video files can be exchanged.

- **News group**

  A facility provided for receiving information and exchanging views among the groups with same desire. When the membership is obtain in a news group preferred by oneself, new trends, knowledge and information of that field will be received automatically through the internet.

- **Tele Computing**
  - Facilitating the use of another computer connecting to the internet and using a computer located one place is known as tele-computing.
  - Through this one can use the computer in his office by accessing through the home computer.

The facilities obtained by a person for day-to-day activities

- E-mail facilities
- Watching of web pages
- Internet chatting
- Telephone facilities
- Transaction of files

- Facilities to watch e-conferences, televisions and to listen to radio and e-news.
- Facilities for e-magazines, e-library
- E-channeling service

Usage of Internet to make the functions of an organization easily

- For e-commerce affairs
- Ability to advertise goods and services
- Ability to obtain necessary information of one's competitors.
- Using it so as to minimize the communication cost.
- For expanding one's market all over the world.
- For obtaining information easily and fast
- For conducting business affairs using social websites by businesses